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## DEVELOPMENT OF INTELLIGENCE TESTING OF THE BLIND AND VISUALLY IMPAIRED

### INTRODUCTION-

The discipline of intelligence testing of children has been developing since the beginning of this century. Since Alfred Binet's early efforts to measure the intellectual capacities of school aged children, many have followed by developing more tests that assess specific abilities as well as general verbal and performance skills. These earlier assessment tools were developed for use with the average population. The objectives of the tests were to measure the child's abilities and identify those not within the normal range. As the tests became more sophisticated, they were standardized by administering them to as large a group as possible. This larger group supposedly served to represent a cross section of the normal range of intelligence and included children of high, average and low ability. This sample of children rarely included anyone with an additional handicap or other differentiating characteristic.

The Stanford-Binet Intelligence Scale (S-B) and the Wechsler Intelligence Scale For Children-Revised (WISC-R) have become the two predominant tests for assessing children's intelligence. These scales were revised in 1960 and 1974 respectively. In 1972 the Stanford-Binet norms were revised and a less homogeneous standardization group was used which included non-white and white children. The revised edition of the WISC was standardized on 2,200 children of mixed cultural backgrounds in approximately the same proportions as that reported in the 1970 U.S. census data (Sattler, 1982).

This change in standardization procedures indicates a developing consideration for the heterogeneous nature of our population as well as a recognition of the effect of different cultures on the assessment of intelligence and the difficulty in comparison across cultures. The same heterogeneous factor has been considered in testing other

populations. The norms and reliability of these standardized tests have been questioned when such populations as the visually impaired and blind have been tested (Parker 1969, Silberman 1981, Kastenbaum 1981, et. al.). After a survey of the literature one may question the validity of assessing visually impaired and blind children with tests that have been normed on a population that is experientially and educationally quite different. What are the differences and are they significant enough to challenge the reliability and validity of the use of standardized tests?

This paper attempts to review the trends of intelligence testing of the blind and visually impaired, as well as to identify some of the inherent problems and modifications that are most commonly employed. In his manual for the Blind Learning Aptitude Test, Newland (1971) points out that the acculturation of the young blind child is highly varied compared to that of the sighted child. Therefore it is important to recognize the disadvantages and divergent backgrounds among the visually impaired population.

#### CONCERNS IN TESTING THE VISUALLY IMPAIRED AND BLIND-

Once the visually impaired and blind population is recognized as being substantially different from that of the sighted population, questions quickly arise concerning the administration and interpretation of the assessment tools used. Rose-Marie Swallow (1981) identified four areas of concern when assessing the blind and visually impaired;

1. Visual loss compounds the assessment process because of the known interrelationships of sensory, motor, cognitive and emotional factors.
2. The multiplicity of physical and environmental conditions may contribute systematically to the functional delay of the child.
3. The performance of the student on a standardized assessment instrument may not be a valid indication of skills and abilities.
4. Modifications of formal testing procedures generally are considered to generate unreliable results.

Swallow maintains that the norms developed for sighted children cannot be considered a valid estimate of the learning potential of visually impaired children. Although it is recognized that the visually impaired and blind are often mainstreamed with sighted children, both in school and employment situations, for the most part, the test modifications that are necessary for the visually impaired and blind have not been researched and therefore are unsubstantiated (Swallow, 1981). Procedures for test modifications and adaptations will be reviewed later. A concern expressed by many (Swallow 1981, Seholl & Schnur 1975, Coveny 1976 and Genshaft, Darc and O'Malley 1980) questions what is being tested by the standardized instruments and how it relates to the abilities of the visually impaired and blind. The students' performance on a standardized instrument may not reflect the intellectual or developmental level, but rather indicate sensory intactness or motor coordination, perceptual and cognitive organization, or familiarity with the demands of the task (Swallow, 1981). The visually impaired student will be at a great disadvantage if the tasks deal with visual representation or visual references.

In 1979 the Los Angeles Unified School District developed recommendations for modifying the district's high school proficiency tests so that visually impaired and blind students could be more appropriately assessed. The committee included administrators in the field of education of the visually impaired, itinerant and resource teachers of the visually impaired, a psychologist, a blind high school student, a parent and seven blind adults from a variety of backgrounds. The major concern of the committee's discussions was the degree and extent to which life and school experiences of visually impaired individuals can and should parallel those of sighted individuals (Efron and Gibson, 1981). Many items on the proficiency tests such as knowledge of application forms, IRS 1040 forms and auto warranty cards were said to be inappropriate on the basis of their visual demands or experiential characteristics. Only by having such forms read to them can the visually impaired become familiar with their structure. Knowing



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these forms is not equivalent for the visually impaired and the sighted. Instead, it was suggested that these items be replaced by some of the following: cassette recorder, warranty, bus schedules, information form on Braille repair or Kurzweil reading machine manual. These items are of importance to the visually impaired and blind and are believed to be equivalent to those forms listed earlier for the sighted. Efron's committee on modifying the SHARP (Senior High Assessment of Reading Proficiency) points out some of the conceptual, educational and experiential differences between the visually impaired and sighted and how they affect the performance on a standardized test. Though these differences are more complex to assess, there are other more apparent pragmatic adjustments that must be made in order to administer a standardized test to a visually impaired or blind individual.

John Morse (1975) has outlined some of the more common concerns of psychologists as they are confronted with this assessment issue. Initially the psychologist should identify why he is testing the visually impaired child. In general the objectives of testing the child are to develop a clearer understanding of the child's educational needs so that appropriate planning and programming can be completed.

The child's visual etiology and prognosis is important and the assessor should make himself aware of how the child's vision will affect his test performance. This can best be done by talking with other people who work with the child, observing the child as much as possible and interviewing the child about his school performance and the test situation. Knowledge of the child's visual history is important in order to put his test performance and behavior in perspective. The child's visual history should be known. For example, has the child ever had vision? Will the child be able to rely on some visual memory? According to Morse the child must have had vision for at least the first five years of his life in order to have any usable visual memory, but no justification of this statement was made in this report. Depending on the child's visual and intellectual experiences and abilities, Morse's statement may be debated.

Morse (1975) expresses an important concern in relation to what the child can see and how he interprets that visual image. There may be a difference between what can be seen and the conceptual knowledge needed to understand what is seen. Awareness and sensitivity may also create a problem. Additionally, the partially sighted child may possess a learning disability distinct from the visual impairment (Morse, 1975). Therefore what may appear to be a visual perceptual problem may or may not be caused by the child's limited visual acuity. Special testing conditions may have to be considered. It is very important to talk with the child's vision or classroom teacher to learn what can be done to assist the child in seeing most efficiently. Because of the attitudes towards blindness and visual impairment it is important to consider the child's self-concept in the testing situation. The child may have strong feelings about the testing experience and this may affect his performance and behavior. The child may have experienced many negative testing situations or been exposed to improper testing procedures. It is important to relieve the child of his anxiety and allow him to become oriented, and comfortable with the situation. The child may have to be shown around the room and introduced to the testing materials. It must be remembered that the visually impaired or blind child is at a disadvantage and should be informed of the test situation. A sighted child would be able to learn a lot by observation of the test location, the tester and the test items. The visually impaired child should be given a full explanation, before the administration of the test, so that he knows as much as a sighted child would.

It is the opinion of Morse (1975) and other psychologists that the I.Q. of a visually impaired child is essentially the same as that of a sighted child but several qualifications are necessary. It is most important that the profile of the sub-test scores be considered rather than the intelligence quotient. The intelligence quotient may be needed if categorization of the child is the objective of the test situation. For educational planning, understanding of needs and remedial planning, the sub-test



scores will give the most information. According to a psychologist at Perkins School for the Blind, the sub-test scatter scores are most helpful in identifying the child's strengths and weaknesses. Every three years an updated I.Q. is required for the child's records but it is the sub-test performance that is most closely analyzed and used in the planning of the child's academic program. Morse (1975) reminds us that tests of intelligence reflect current functioning and that inferences regarding potential must be made with considerable caution, if at all. Visually impaired and blind children often score lower on the sub-tests of conceptual skills and higher on those assessing short-term auditory sequential memory for non-meaningful information (Morse, 1975). This skill is assessed with digit span activities. Extreme verbalization is a common characteristic among visually impaired and blind children and should not necessarily be equated with the ability to conceptualize. Children may possess a verbal veneer but often lack the experiential base necessary for conceptualizing the world around them (Morse, 1975). It is often apparent that visually impaired and blind children exhibit experiential and developmental lags. It would be a misconception to assume that their higher auditory memory scores reflect an inherent superiority. In all probability, it is explained by their need to perceive the world auditorily (Morse, 1975).

It has been reported by Cutsforth (1951) and Tillman (1967) that many visually impaired and blind children develop pseudo-verbal skills which may inflate verbal mental measurements (Coveny, 1976). Coveny (1976) has found that Classen (1954) and Tillman (1967) reported that blind children often have a highly developed aural memory on which they sometimes rely as a substitute for thinking. Disproportionately high scores on the Digit Span sub-tests of the Wechsler Scales and similar sections of the Interim Hayes-Binet Intelligence Test for the Blind, 1942 lend support to this position. This concern with the verbal skills of the visually impaired points out the importance of sub-test analysis and de-emphasis of using only one primary test. It is common procedure at Perkins School for the Blind to administer at least two intelligence tests to a child

and compare their scores for interpretation. Most often only the verbal scale of the Wechsler Intelligence Scale-Revised is given and the Blind Learning Aptitude Test (BLAT) by E. Newland is given to determine a performance score.

Morse (1975) suggests administering the Performance Scale of the Wechsler in order to obtain valuable diagnostic information concerning the utilization of vision and possible functional difficulties. He also suggests that it is frequently necessary to eliminate a sub-test score and pro-rate the remaining scores to achieve a performance scale I.Q. score if necessary. Time limits imposed by the proper testing procedures are always a concern of those assessing the visually impaired and blind. The common procedure at Perkins School for the Blind is to allow the child time and a half or twice as much time. Morse (1975) agrees with this suggestion but adds that if the child is not able to solve the problem within this additional time period the task should be terminated to prevent the child from becoming frustrated or anxious.

#### HISTORY OF THE DEVELOPMENT OF INTELLIGENCE TESTS FOR THE VISUALLY IMPAIRED AND BLIND-

The earliest modification of a standardized intelligence test for use with the blind was completed by Robert Irwin and H.H.Goddard in 1914. Using the 1911 edition of the Binet scales Irwin, who was blind himself, selected the items and arranged them according to age groups for the blind (Coveny, 1976). At the same time T. Haines developed a point scale for the Binet-Simon Year Scale and adapted the test by substituting and deleting items that he judged inappropriate. All adjustments were made based on his personal judgment. Chronological age ranges were developed by administering the test to 142 children (Coveny, 1976). In these early adaptations it is important to note the lack of empirical data to substantiate the changes made. Haines' objectives in adapting the test was to develop an instrument that would identify the feeble-minded visually impaired. Later in 1919, eight<sup>y</sup> six additional children were tested



to adjust the norms. Unfortunately the sole purpose of the instruments was to label the children and support their removal from the residential schools for the blind. In 1923 Samuel P. Hayes made his first attempt to revise the Stanford revisions of the Binet Age Scales (Coveny, 1976). Hayes reviewed 1,200 test items at this time. Later in 1930 Hayes again revised the Stanford-Binet by evaluating an additional 1,600 items. Little information is available about the specific methods that Hayes used in attempting these revisions other than to use his own judgment and experience. In 1942 Hayes made his final revision of the 1937 Terman-Merrill Binet revision. This was known as the Interim Hayes-Binet Intelligence Test for the Blind (IH-B). The IH-B is still used today though it was supposedly developed as an intermediate test before a more refined assessment tool was constructed. Though Hayes contributed a lot to the field of assessment of the visually impaired no statistical studies or standardization was ever published. Hayes intended that the IH-B be used to compare children in residential schools for the blind with other blind children in public schools and not with sighted children (Coveny, 1976). Hayes also worked on adaptation of the Stanford Achievement Test. A braille version of the SAT was produced and Hayes used it to compare sighted and blind children. Hayes concluded that the same high reliability existed for sighted and blind children and that the norms for sighted children could be used as standards for blind children (Coveny, 1976).

Samuel P. Hayes has made the most significant contributions to the field of academic and intellectual assessment of the visually impaired and blind. After World War II Mary K. Bauman also contributed to the area of vocational and rehabilitation assessment of the visually impaired. She concentrated on developing norms based on the performance of the blind and standards for test interpretation.

## OBJECTIVES OF INTELLIGENCE ASSESSMENT TOOLS

Vander Kolk (1981) emphasizes a holistic approach to assessment of the visually impaired. His reasons are that testing simply involves taking samples of behavior, from which generalizations are made. Therefore, the samples of behavior must represent the various dimensions and characteristics of the individual. A multidimensional approach in which a battery of instruments is employed is ideal and it should be followed by an integration of the data collected to develop a composite of the person assessed (Vander Kolk, 1981). The techniques followed at the Perkins School for the Blind emphasize the sub-test scatter so that the strengths and weaknesses of the children are identified. Much observation is also done to complete the picture of the student. According to Vander Kolk (1981) the most important purpose of assessment is to determine the impact of blindness on the various aspects of a person's life, and how that person plans to deal with that impact. Silberman (1981) points out the differences and importance of both formative and summative evaluation. In formative evaluation, the purpose of collecting and using data is to make quick determinations about whether the intervention process must be altered to maintain or improve a student's performance. In summative evaluation, the purpose is to describe or summarize a student's progress over a longer interval. Both types of evaluation need to be reflected in educational programming (Silverman, 1981).

## REVIEW OF SPECIFIC TESTS USED WITH THE VISUALLY IMPAIRED AND BLIND

In 1950 Samuel P. Hayes looked at the Wechsler Bellevue Form I Scales (W-B) in terms of its validity and reliability for use with the visually impaired. According to Coveny (1976), Hayes reported correlations between the Interim-Hayes Binet (I-HB) and the W-B that ranged between 0.88 and 0.96. Reliability for the W-B was between 0.84 and 0.90 and for the IH-B between 0.90 and 0.93. There were fairly normal distributions of scores according to Hayes and he concluded that there was sufficient

evidence to justify the use of the W-B with the visually impaired. Swallow (1981) reports that the III-B for use with children 3-21 years old takes between thirty minutes and an hour and a half to administer. This scale combines verbal items from Form L and M of the Stanford-Binet. It should be noted that the III-B has become somewhat outdated since its development in 1942 and that it is verbally demanding (Swallow 1981, Vander Kolk 1981).

The Wechsler Intelligence Scale for Children-Revised (WISC-R) is now the most widely used intelligence test with the visually impaired. Vander Kolk (1981) encourages the assessor not to compute an I.Q score but to use the sub-tests as a means of observing the child's behavior in solving problems. The verbal portion of the test can be administered to the blind. One controversy concerning verbalism of the blind must be considered. As stated earlier, the blind in general have a greater ability to use words but do not always possess the conceptual understanding of the language used. Consequently, their abilities in some areas may be overestimated. The WISC-R has not been standardized among blind children so the interpretation of the scores should be examined carefully. Methods of adapting the performance scale of the WISC-R have been suggested but other tests have now been developed that assess performance skills.

The Blind Learning Aptitude Test (BLAT) developed by Newland in 1969 is said to measure the learning potential of blind individuals ages 6-20. It is referred to as a process test and allows the child to demonstrate his problem solving skills, relationship concepts, sequencing and ability to follow directions. Knowledge of braille or verbal skills ~~is~~ not required. Suggested use is for children between 6-20 though norms were developed with children ages 5-21. The test was standardized on 960 blind children from both residential and day schools. Genshaft, Dare and O'Malley (1980) reported the reliability coefficients for various age groups to be approximately .90 and the reported correlations between the BLAT and the WISC verbal score and the Hayes-



Binet to be .60 to .89, and .75 respectively. The BLAT has 49 items in five categories and takes between 40 minutes and one hour to administer.

The Perkins-Binet Test (P-B) is the newest test of intelligence for the blind that was developed by Davis in 1980. The P-B has two forms, Form N for children with no vision, ages 4-18 and Form U for children with some usable vision, ages 3-18. Interpretation of results for children under age 6 is cautioned against because few children of this age were used in the standardization sample (Ward, Genshaft, 1983). It is recommended that three sub-tests, Vocabulary, Memory for Digits and Block Assembly be used to determine which form, N or U should be used. Ward and Genshaft (1983) feel that the assessor may still not be able to appropriately assess the child's visual function. Most psychologists will recommend additional observations of the child and interviews with the classroom and vision teachers. Criticism of the test has been directed toward the lack of sufficient materials needed for administration of the test, confusing directions for some tasks, and no specific time limits for some items. It is strongly suggested that the assessor thoroughly review this test and establish his procedure for administration since the directions are not always clear. Teare and Thompson (1982) examined the concurrent validity of the P-B in a project that included 28 children, mean age 13.3. Fourteen of the children used Form N and fourteen used Form U. The results of their research found high correlation between both forms of the P-B and the verbal scales of either the WISC-R or the WISC-R and WAIS together. Form N correlated with the WISC-R at  $r = 0.97$  ( $p < .01$ ) and with the WISC-R and WAIS together at  $r = 0.95$  ( $p < .01$ ). Form U correlated with the WISC-R at  $r = 0.93$  ( $p < .01$ ) and with the WISC-R and WAIS combined at  $r = 0.93$  ( $p < .01$ ). Teare and Thompson also found that the differences between Form N and Form U and the WISC-R in combination with the WAIS were not significant. The standard deviations for both forms of the P-B, however, were considerably larger than those for the Wechsler scales (Teare, Thompson, 1982). These findings suggest that the Perkins-Binet and the Wechsler-

R verbal scales do measure similar abilities, but because the standard deviations are large the tests should not be used interchangeably. From the literature review, it does not appear that the Perkins-Binet is being widely used at this time. Further research needs to be done on larger groups of subjects to determine the reliability of the P-B and predictive validity of this new assessment instrument.

## SUMMARY

Intelligence testing of the visually impaired and blind is being done by using both standardized tests normed on sighted children and tests developed specifically for the blind. When using tests normed on sighted children, the assessor must be aware of the education and experiential differences of the two populations. The objectives of his assessment must be clear and he should be thoroughly familiar with the visually impaired child's visual etiology and educational background. Interpretation should be based not only on the test results but on observations and interviews with those most familiar with the child's development. Gradually, intelligence testing is being used more to identify strength and weaknesses of the child for more appropriate educational planning. Less assessment should be done for the purposes of labeling, categorizing and exclusion of educational opportunities.

More tests are being developed specifically for the blind and visually impaired. These tests are normed on only visually impaired and blind children and can therefore more accurately assess the child's ability as it compares with the visually impaired and blind population. It must be remembered that the visually impaired and blind encompass a very heterogeneous population because of different educational and experiential backgrounds. Interpretation of these tests will become more sophisticated as more research is done to identify the validity and reliability of these assessment tools. Larger groups of visually impaired and blind, as well as sighted children, need to be included in the research. The mainstreaming influence is affecting the visually impaired

and blind and therefore, under some circumstances, they should be tested on an equal basis. What that equal basis is will be determined by continued research and comparison of the intelligence assessment tools used with each group and by both the sighted and visually impaired and blind populations.



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